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ABSTRACT

A study was conducted to determine whether subject-related writing tasks assigned in college courses (1) increased the amounts and clarity of student learning, (2) led to improved student writing performance, and (3) changed levels of student apprehension about writing. Students enrolled in two sections of courses taught by each of four instructors in four different content areas were subjects for the study. Comparisons between data for experimental and control groups for each instructor were examined using analysis of covariance and chi square in a quasiexperimental pretest/posttest design with concurrent replications. The greatest significant differences resulted from comparisons between clarity of concepts learned by writing and clarity of concepts learned without writing. Subjects assigned writing tasks had significantly higher gains in learning content subject area. Differences in apprehension and in writing performance were not significant. (Author/FL)

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WRITING TO LEARN

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Writing to Learn

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Objectives

This study is part of a broad inquiry into the effects writing tasks have on students: to determine what changes in the amount and clarity of content learning, if any, result from students doing learning-centered writing in content courses; what changes in student writing quality accompany such writing; what attitude changes accompany such writing; what kinds of writing tasks are most useful in inducing positive change; and whether teacher effectiveness is changed as a result of assigning writing in content courses.

Theoretical Framework

The teaching profession seems largely responsive to the idea of writing across the curriculum (Martin 1975b), but considerable uncertainty exists about why or how to implement it. Content teachers may not accept a writing emphasis in their courses because they may see no purpose for doing so other than to improve student writing, which is, they argue, a job for English. They may also be concerned that increased writing will increase student apprehension. Even if they do assign writing in their classes, they are likely to use it merely as a form of discipline or a means of testing, thus compounding rather than solving student writing problems. Yet it can be argued both that writing improves learning, and that the kind of writing that does so is not necessarily rigorously formal and dreadfully academic.

The claim that writing improves learning has not been systematically tested or measured, nor have individual strategies of writing-as-learning, especially those most readily applied outside of English class, been extensively assessed. The writing-across-the-curriculum movement tends to be general and philosophical (Nystrand, 1977; Emig, 1977), or descriptive (Writing Across the Curriculum Project Pamphlets, 1973-76; Britton, 1975; Martin, 1976a,b), or hortatory (Emig, 1977; Shaughnessy, 1977). Published empirical data on inter-disciplinary writing programs pertain to faculty attitudes and practices as teachers of writing (Klinger, 1977; Zemelman, 1977; Benrens, 1978), not to their effects on students.

Yet past research on writing and learning as distinct and separate processes has been substantial (Bruner, 1966; Cooper, 1975; Odell, 1974; Smith, 1969). Some of this research evaluates certain intellectual processes in increasing writing effectiveness (Rohman & Wlecke, 1964; Odell, 1973). The psychologists Vygotsky (1962), Luria (1971), and Bruner (1971) indicate that writing is a complex act demanding the use of higher cognitive functions, such as analysis and synthesis (cf. Britton, 1973), and Luria (1971) and Young, Becker, and Pike (1970) make a strong theoretical case for writing as an heuristic and thought-organizing process (cf. Pike, 1964a,b; Ney, 1971; Fitts and Posner, 1967; Cox, 1933; Piaget, 1952, 1972; Inhelder and Piaget, 1964, Flavell, 1963; Bruner, 1956, 1957, 1962, 1966b, 1968, 1973; Globin, 1973). In a key article, Emig (1977) contends that both as a process and a product writing possesses a cluster of attributes that correspond uniquely to certain powerful learning strategies. Increased learning may result from writing because writing involves more of the psychomotor processes of the learner, more of the cognitive processes, and more independence in the organization of thoughts and feelings than other learning modes.

Writing actually provides a significant opportunity for student involvement and participation in the learning process. Emig (1977) notes that writing is active, engaged, personal, and self-rhymed in nature, precisely the same attributes, according to Polanyi (1958), of successful learning. It follows that if learner involvement of the sort that writing provides is increased, then learning will also be increased.

Stalling and Kaskowitz (1974) found that learners learn more when they actively participate in the learning process. When writing is used as a means of classroom learning, all learners actively participate by writing. If writing allows for more independence as well as more participation in the learning process, it should increase learning. If the learner activity is accompanied by feedback, the amount of learning should increase still further. (Lawrence and Goodwin, 1954; Travers, 1973; Bilodeau and Bilodeau, 1961; Smith, 1960; Hilgard and Bower, 1975; Thorndike, 1924; Thelen, 1967; Gagne, 1970.

According to a number of recent studies, especially those by Britton and Martin, we may expect these results to be attained primarily through expressive, speculative, knowledge-forming, and value-testing modes of writing (Britton, 1975; Martin, 1967b; Young, 1979). Such writing differs markedly from the finished written product communicative or transactional in purpose and steeped in formal academic conventions; it is not evaluated by those conventional standards, is therefore unfamiliar to most teachers, and is likely to seem frivolous to many. Yet it may be said to create an optimal environment for students to use written language frequently and meaningfully for learning (Britton, 1975; Martin, 1967a,b).

The essential purpose of such writing is to answer either or both of two related questions--how well am I the learner learning something, or how well can I express something being learned--or any variation of them. Personal revelation is encouraged, even when the writing responds to specific queries or readings, as is not the case in most college or school writing. This kind of writing is what we define provisionally as learning-centered.

Learning-centered writing should not increase students' apprehension toward writing. Writing apprehension, as defined, by Daly and Miller (1975b) when they developed an instrument to measure it, reflects a person's predisposition to respond favorably or unfavorably toward situations where writing is required. Since 1975, Daly and others have been reporting research showing relationships between writing apprehension and other variables. Significant relations between amounts of writing apprehension were reported with diversity, length, quality, and intensity of language (Daly & Miller, 1975a; Daly, 1977), and with performance on standardized tests of writing competency (Daly, 1978), with selection of courses involving writing (Daly and Miller, (1975c) with teacher expectations (Daly, 1979), with amount of change in attitudes about writing (Toth, 1975), and with occupation selection (Daly and Shamo, 1976). Daly and Miller (1975c) also report a study that shows that writing apprehension as measured by self-report tends to be relatively independent of other individual differences, such as SAT scores, success expectations and sex differences.

The purpose of the present study was to test the following four hypotheses about the use of learning-centered writing in content classes: (1) The more that students do such writing in their content courses, the better they will write; (2) The more that students do such writing, the less apprehensive about writing they will be; (3) The more and the more often that students do learning-centered writing about a subject, the more they will learn about it; and (4) The

concepts students do learning-centered writing about will be clearer to them than the concepts they do not write about.

Data Source

College students enrolled in two sections of courses taught by each of four instructors in four different content areas at West Chester State College, West Chester, Pennsylvania, during spring 1979 were the subjects for this study. The data collected from students enrolled in two sections of a graduate reading course, two sections of a graduate research and statistics course, two sections of an undergraduate course in educational psychology, and a large lecture section in physical science in which 92 students were randomly assigned to experimental and control groups and then "flip-flopped" in mid-semester are reported as concurrent replications.

Methods and Techniques

In this study a quasi-experimental nonequivalent control group design for subjects in intact classes was used with pre-/post-test analyses. With comparisons between the three sets of control and experimental classes, analyses of covariance were used to correct for the lack of sampling equivalence. The data collected from the physical science class, which had a within subjects design, were analyzed using analysis of variance with repeated measures. Pre and post tests were administered to the experimental and control groups to measure subject knowledge, writing skills, and writing apprehension. To measure writing skills, a teacher-assigned question requiring fifteen to twenty minutes of writing produced pre and post writing samples, both of which were randomly mixed and submitted to an independent group of trained graduate students for general-impression holistic scoring. An abbreviated form of the Daly-Miller writing apprehension inventory was used to pre and post test writing apprehension. A valid and reliable teacher-made and teacher-graded test of content was the basis for pre and post testing amounts of knowledge learned.

Content and teaching methods were held constant between experimental and control groups except for the use of the experimental variable, learning-centered writing assignments, in the experimental classes alone. In using the learning-centered writing students responded directly to concepts taught and tasted in class. Written responses were to specific questions, readings, discussions, or other class-related activities. Either teacher or peers evaluated the writing minimally and supportively. There was a wide variance in the kinds of learning-centered writing assignments: some were brief, as short as two or three minutes of writing; some were expressive and personal, while others were formal and transactional; some were speculative, some communicative; some interrupted or closed a class, while others were done outside class; some were preceded or followed by a discussion of their content and/or form.

In the experimental classes, at the end of each class each student was asked to respond in writing to two questions: "Which concept dealt with in today's class is most clear? Which is least clear?" Data from these responses were analyzed using chi square analysis after concepts perceived as most and least clear had been classified according to whether or not they were learned by writing.

Results and Conclusions

The greatest differences measured in this study were for the chi square analyses of the amounts of clarity related to whether the concept learned was written or not written (See Table II). Written concepts were learned with more clarity than non-written concepts ($p < .01$). Amounts of knowledge gain were higher in each of the experimental groups when compared with the control groups, but the difference was significant ($p < .05$) only in the comparisons for the statistics classes (See Table I). Writing apprehension decreased in each of the experimental groups, but when compared with the control groups none of the differences were significant (See Table I). Writing skills improved from pre to post assessment in both the experimental and control groups for two of the three comparisons. In the physical science class writing skill decreased in both experimental and control groups. None of the differences were significant (See Table I).

Educational Importance of the Study

If further research with learners at various levels, i.e., elementary and secondary as well as college learners, confirms the findings that using learning-centered writing in content areas increases learning, such data would provide powerful evidence to convince any school or school district to adopt a cross-disciplinary approach to writing. Correlations between gains in writing skills and decreases in writing apprehension would affirm the value of supportive and anxiety-reducing learning-centered writing in content courses. Reductions in writing apprehension would provide teachers with further reasons for using writing to increase learning and to help learners enjoy both writing and learning.

TABLE I

SUMMARY TABLE FOR ANALYSIS OF COVARIANCE
FOR PRETEST, POSTTEST, AND ADJUSTED POSTTEST MEANS
AND REPEATED MEASURES ANALYSIS OF VARIANCE ON ONE COMPARISON

Criterion	Subject	Factor level	Pretest mean	Posttest mean	Adjusted posttest mean	F
Writing skill (Hypothesis 1)	Statistics (N=8)	Experimental	3.17	3.67	3.60	.61 (NS)
		Control	4.00	4.33	4.46	
	Psychology (N=31)	Experimental	5.21	5.36	5.21	.26 (NS)
		Control	4.17	5.44	5.56	
	Physical Science (split group) (N=61)	Experimental	5.67	4.87	4.76	.13 (NS)
		Control	5.22	4.53	4.64	
Writing Apprehension (Hypothesis 2)	Statistics (N=20)	Experimental	80.79	83.57	85.76	.09 (NS)
		Control	91.14	91.86	87.48	
	Psychology (N=37)	Experimental	92.21	92.63	90.12	1.30 (NS)
		Control	86.95	91.58	94.09	
	Reading (N=13)	Experimental	80.00	84.13	88.09	.35 (NS)
		Control	91.17	90.50	85.21	
Content learning (Hypothesis 3)	Statistics (N=25)	Experimental	53.13	98.31	99.22	4.82
		Control	57.70	93.10	91.65	
	Psychology (N=43)	Experimental	13.65	57.95	57.77	.53 (NS)
		Control	13.42	55.83	55.98	
	Reading (N=18)	Experimental	16.00	82.22	83.66	1.20 (NS)
		Control	17.70	80.20	78.30	
	Physical Science (split group) (N=92)	Experimental		71.80		.75 (NS)
		Control		69.04		

*Repeated measures analysis of variance

TABLE II

CONTINGENCY TABLES FOR IDEAS WRITTEN AND NOT WRITTEN BY AMOUNTS OF CLARITY OF LEARNING

		Written ideas	Not written ideas
Comparisons for Graduate students in Statistics			
	Most clear	127(83)	10(54)
	Least clear	39(83)	98(54)
	$\chi^2 = 118.35$	$p < .0001$ total for semester	
Comparisons for Graduate Students in Reading			
	Most clear	78(50.49)	24(51.51)
	Least clear	21(48.51)	77(49.49)
	$\chi^2 = 60.57$	$p < .0001$	

df 1
Expected values are in parentheses

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